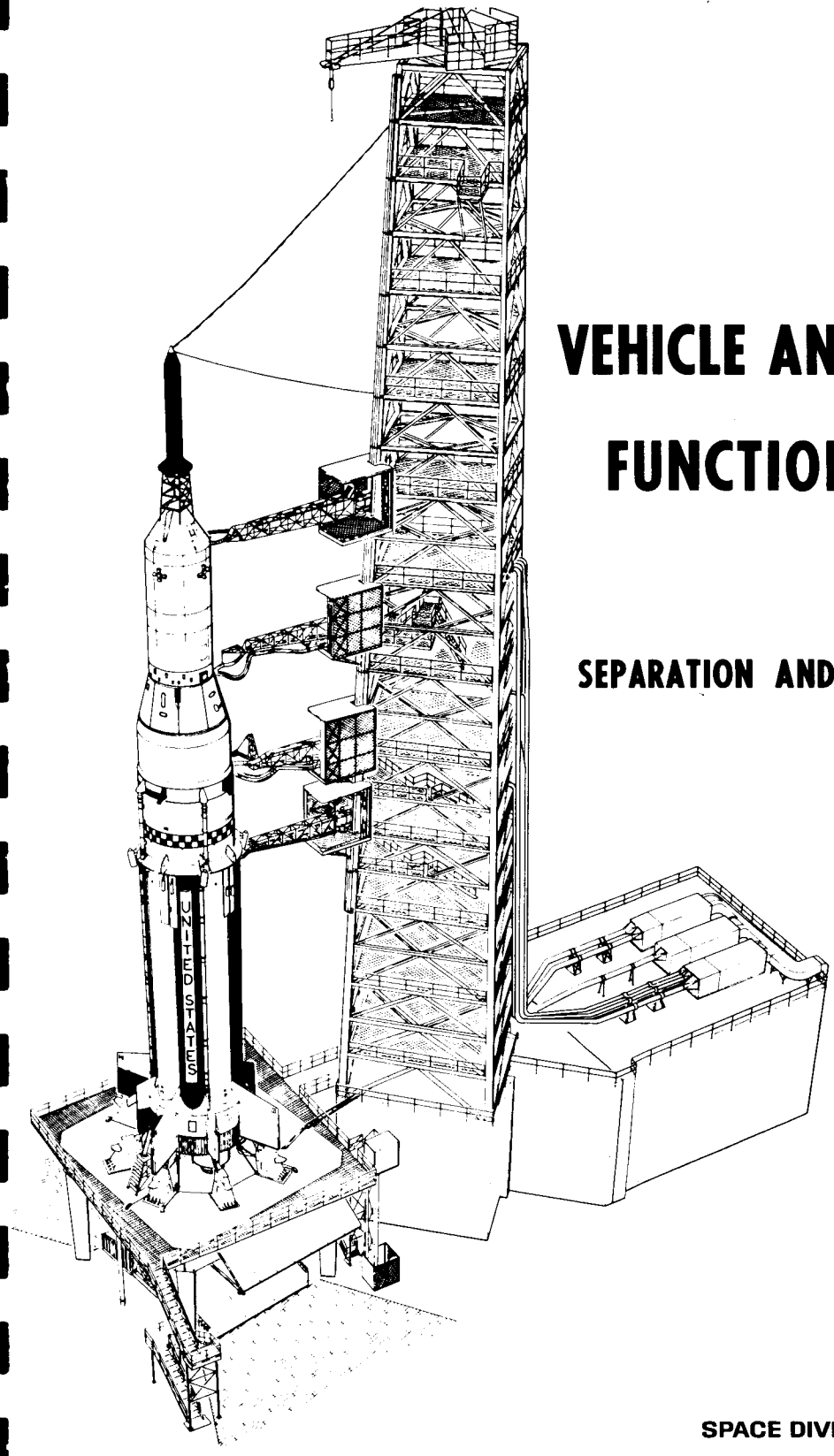
HEC-D942
VOLUME X



SA-9
VEHICLE AND LAUNCH COMPLEX
FUNCTIONAL DESCRIPTION

SEPARATION AND FLIGHT TERMINATION SYSTEMS

SPACE DIVISION CHRYSLER CORPORATION
HUNTSVILLE OPERATIONS

HEC-D042
VOLUME X

SA-9
VEHICLE AND LAUNCH COMPLEX
FUNCTIONAL DESCRIPTION

SEPARATION AND FLIGHT TERMINATION SYSTEMS

MARCH 1964

ENGINEERING COMMUNICATIONS DEPARTMENT

SPACE DIVISION CHRYSLER CORPORATION

HUNTSVILLE OPERATIONS

FOREWORD

This volume has been prepared for the Functional Integration Section, Systems Integration and Operations Branch, Vehicle Systems Division, Propulsion and Vehicle Engineering Laboratory, by Engineering Communications Department, Chrysler Corporation Space Division, under contract number NAS8-4016.

The following series, of which this volume is a part, functionally describes the mechanical and electromechanical systems of Saturn I, SA-9 space vehicle and Launch Complex 37:

Volume I.	RP-1 Fuel System
Volume II.	LOX System
Volume III.	LH_2 System
Volume IV.	Nitrogen and Helium Storage Facility
Volume V.	Pneumatic Distribution System
Volume VI.	Environmental Control System
Volume VII.	Launch Pad Accessories
Volume VIII.	H-1 Engine and Hydraulic System
Volume IX.	RL10A-3 Engine and Hydraulic System
Volume X.	Separation and Flight Termination Systems
Volume XI.	Supplement: Legend and Composite Schematic

Each volume (except Volume XI) contains mechanical schematics and a list of applicable finding numbers.

Volume X is intended for use by NASA and prime contractor management and administrative personnel. All information available by December 5, 1963, has been included; however, separation sequence changes and propellant dispersion ordnance changes established in January and February, 1964, have been incorporated in this document.

TABLE OF CONTENTS

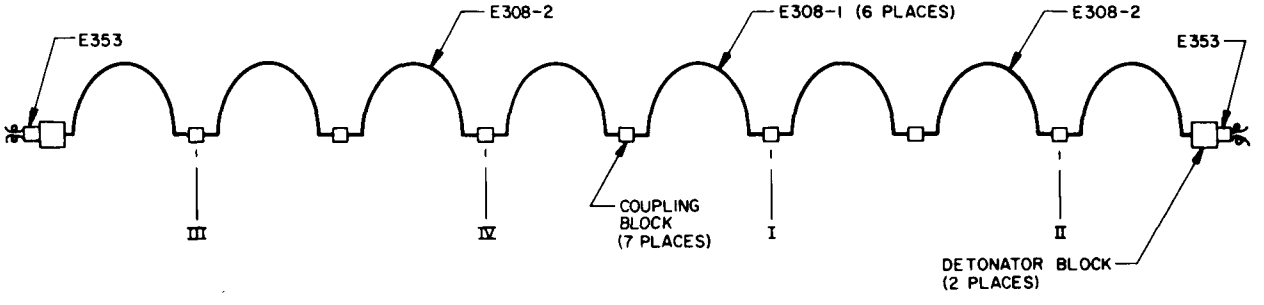
1. SEPARATION SYSTEM DESCRIPTION

The guidance computer initiates all commands necessary to separate the S-IV stage from the S-I stage. The commands begin with LH_2 prestart and continue through ullage rocket jettison, in a predetermined sequence that lasts approximately 60 seconds. Major operations initiated in this sequence include S-IV engine (RL10A-3) prestart, S-I engine (H-1) cutoff, ullage rocket ignition and jettison, retrorocket ignition, separation bolt expulsion, S-IV engine hydraulic positioning, RL10A-3 engine start, propellant utilization system actuation, and transfer of controls and telemetry signals from the S-I stage to the instrument unit and S-IV stage. The computer, located in the instrument unit, issues all commands through flight sequencers in the S-I stage and instrument unit.

The following descriptions include only those electromechanical and chemical (explosive) components that are not an integral part of systems described elsewhere in HEC-DO42.

1.1. Vent Panels

Eight fiberglass vent panels, equally spaced around the S-I/S-IV interstage, are ripped from the interstage by a detonating cord. This vents the oxygen discharged from the RL10A-3 engines during prestart.



Vent Panel Release

Installed along the attaching edge of each vent panel, Detonating Cords E308 form a single explosive harness by joining end to end at coupling blocks. Exploding Bridgewire (EBW) Detonators E353 initiate detonation.

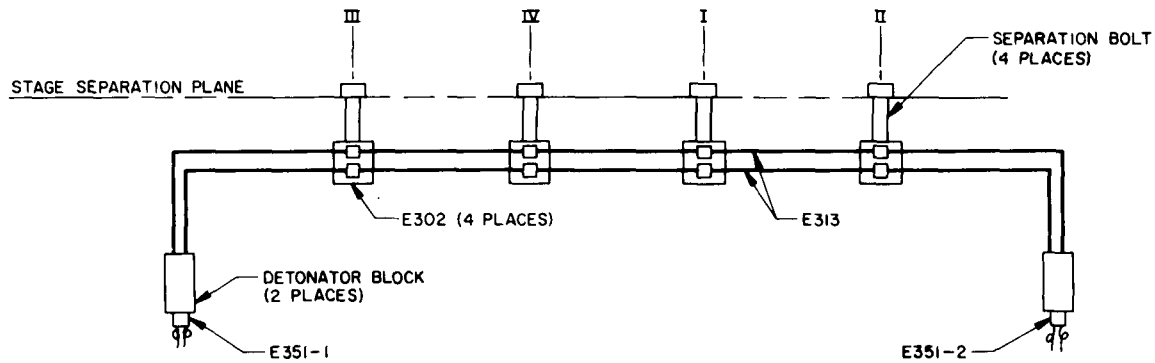
1.2. H-1 Engine Cutoff Initiation Devices

Actuation of any of the four level sensors (B104 and B161) starts the guidance computer time base that initiates inboard engine cutoff. Fuel Depletion Sensors B119 and B120 ensure fuel rich cutoff of the outboard engines.

Volume VIII describes thrust OK pressure switch operation and engine shutdown starting with detonation of the conax valve squibs. Figure 1 on page 17 locates the level and depletion sensors in the propellant containers.

1.3. Separation Bolt Assemblies

Four separation bolt assemblies, just inside the vehicle skin, release the S-IV stage from the S-I/S-IV interstage at station 1146.693. Each bolt assembly consists basically of a bolt, a spring assembly between the bolt head and the S-IV stage aft skirt, and (under the upper interstage ring frame) a frangible nut with two cavities for explosive charges.



Separation Bolt Release

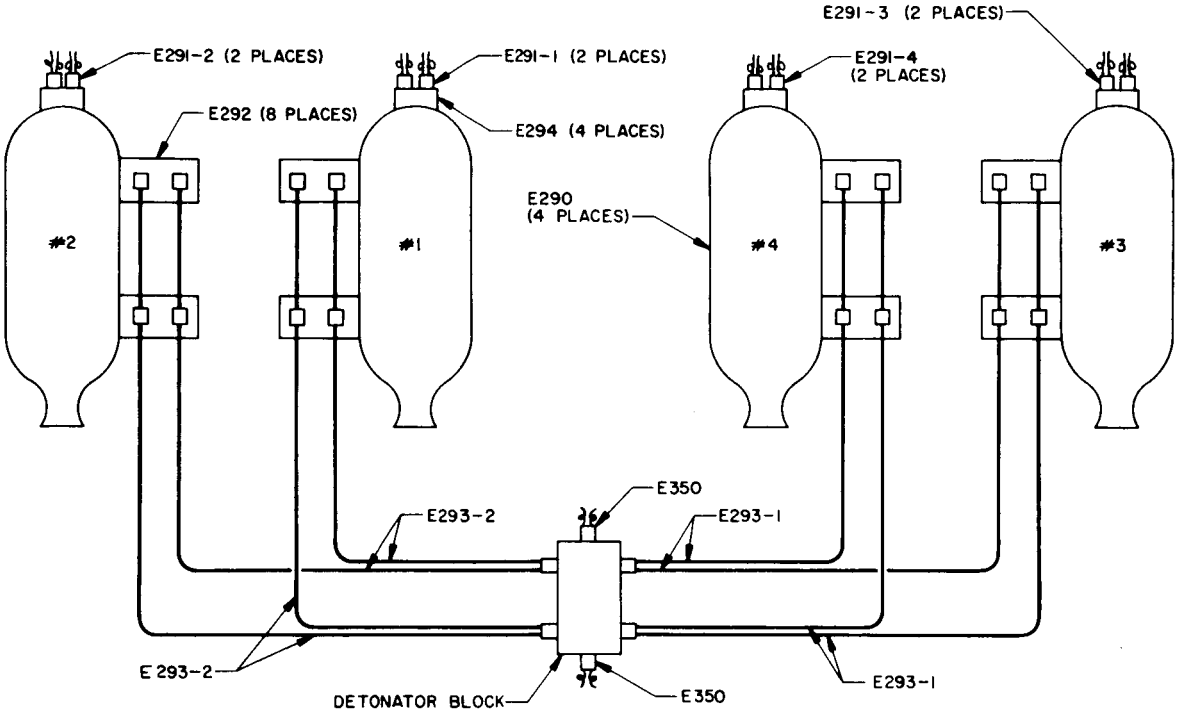
Explosive Harness Assembly E313, consisting of mild detonating fuse and frangible nut explosive charges (shell assemblies), splits Frangible Nuts E302, which allows the spring to eject the bolts. EBW Detonators E351 initiate detonation.

1.4. Ullage Rockets

Four solid propellant ullage rockets accelerate the S-IV stage from the spent S-I stage. This acceleration positions the propellant, and the resulting stage separation reduces the effect of RL10A-3 engine exhaust impingement on the S-I stage. Installation of the ullage rockets on the S-IV stage aft skirt, with their nozzles aft and radially 35 degrees outward from the vehicle centerline, directs the thrust near the center of percussion and reduces exhaust gas effect on the vehicle.

Igniters E294, containing electrically fired Initiators E291, attach to and start Ullage Rockets E290.

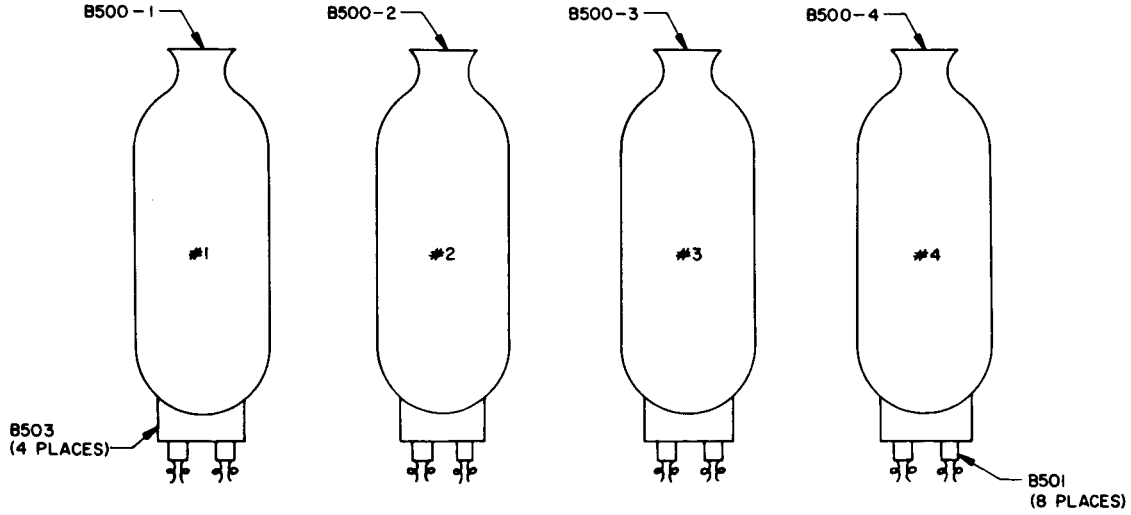
When the two frangible nuts retaining each ullage rocket have split, a spring jettisons the spent rocket. Detonation of Explosive Harness Assemblies E293, each similar to that for the separation bolt assemblies, splits Frangible Nuts E292. EBW Detonators E350 ignite the end of each explosive harness assembly.



Ullage Rockets

1.5. Retrorockets

Four solid propellant retrorockets retard the spent S-I stage. This increases stage separation, further reducing the effect of RL10A-3 exhaust impingement. Installation of the retrorockets on the S-I stage spider beam, with their nozzles forward and radially 12 degrees outward, directs the thrust through the theoretical center of percussion.



Retrorockets

Igniters B503, each containing electrically fired Initiators B501, attach to and start Retrorockets B500.

2. SEPARATION SEQUENCE

The guidance computer issues commands on three separate time bases: lift-off (LO), propellant level sensor actuation (LSA), and outboard H-1 engine cut-off (OECO). The following sequence includes only those commands related to stage separation.

2.1. RL10A-3 Engine Prestart

The computer initiates RL10A-3 engine prestart (described in Volume IX) as follows:

a. A signal at LO +109.3 seconds initiates the LH_2 prestart sequence.

b. A signal at LO +125* seconds charges the vent panel EBW firing units.

c. A signal at LO +134.4 seconds enables (completes the circuit from) propellant Level Sensors B104 and B161. A signal from any of these sensors will then start the second computer time base (LSA).

d. A signal at LSA +0.1* second initiates S-IV LOX prestart and vent panel release.

e. A signal actuates four of the LOX-SOX disposal system valves at LSA +1.2* seconds. A fifth valve opens at LSA +3.5* seconds and the sixth and seventh valves open at LSA +5.0* seconds. (See Volume V.)

2.2. H-1 Engine Cutoff

By firing the inboard engine conax valve squibs, a computer signal at LSA +2.0 seconds initiates the inboard engine cutoff sequence (described in Volume VIII).

A computer signal at LSA +7.0 seconds electrically interconnects the outboard engine thrust OK pressure switches and enables Fuel Depletion Sensors B119 and B120.

If any outboard engine thrust OK pressure switch deactuates, or if either of the fuel depletion sensors actuates, the outboard engines will cut off. If neither the thrust OK pressure switches nor the fuel depletion sensors cut off the engines by LSA +8.1 seconds, a signal from the computer will initiate outboard engine cutoff by detonating the conax valve squibs.

---

*Denotes approximate time. Actual time will be determined after further testing.

Outboard engine cutoff starts the third computer time base.

2.3. Separation Initiation

A computer signal at OECO +0.7 second initiates firing of the ullage rocket initiators. The ullage rockets burn for three to four seconds.

At OECO +0.8 second, the computer emits a separation command that initiates separation bolt release, retrorocket ignition, and S-IV control switch actuation. The frangible nuts break, freeing the separation bolts between 0.011 and 0.018 second after the separation command. The S-I stage retrorockets ignite between 0.033 and 0.068 second after the separation command and burn for 2.15 seconds. The S-IV stage control switch completes actuation between 0.117 and 0.176 second after separation command, transferring the following signals: servovalve control, engine position feedback control, engine position telemetry, engine position telemetry potentiometer excitation, and control switch talkback.

2.4. S-IV Engine Pre-ignition Hydraulic Positioning

A computer signal unlocks the hydraulic system sequence valves at OECO +1.65 seconds, allowing the hydraulic actuators to position the RL10A-3 engines prior to ignition.

2.5. S-IV Engine Start (See Volume IX.)

A computer signal at OECO +2.5 seconds initiates (a) helium heater propellant valve opening (Volume II), (b) RL10A-3 engine start valve opening, (c) RL10A-3 engine LH_2 overboard drain closing, and (d) helium heater and RL10A-3 engine ignition.

A computer signal at OECO +5.4 seconds initiates (a) arming of S-IV stage 'engine-out' capability, (b) de-energizing of helium heater and RL10A-3 engine ignition, and (c) de-energizing of opening solenoids in the hydraulic system sequence valves.

2.6. Propellant Utilization System Actuation

A computer signal at OECO +7.4 seconds actuates the propellant utilization system.

2.7. Ullage Rocket Jettison

A computer signal at OECO +12.8 seconds initiates ullage rocket jettison.

3. FLIGHT TERMINATION SYSTEM DESCRIPTION

Independent yet explosively interconnected flight termination systems (one on the S-I stage and one on the S-IV stage) provide a means of shutting off the engines and dispersing the propellants at any time during powered flight. The decision to terminate flight is based on the imminence of an explosion or on the deviation of the vehicle from its programmed flight path.

Command transmitters along the Atlantic Missile Range provide coded signals to the vehicle flight termination system. This system, on receipt of the applicable signals from a command transmitter, initiates engine shutdown, propellant dispersion system (PDS) arming, and PDS ordnance detonation. The engine shutdown command arms the propellant dispersion system, fires squibs in the H-1 engine conax valves, and de-energizes the S-I stage propellant prevalves and the RL10A-3 engine prestart and start solenoids. The destruct command detonates the PDS ordnance, which severs the RP-1, LH_2, and LOX containers. The resulting propellant dispersion yields an explosion that is only a small fraction of the theoretical yield. To increase reliability, the S-I and S-IV stage PDS ordnance are connected until stage separation.

Each flight termination system consists of the following major components:

a. four antennas that receive signals from the command transmitters,

b. two command systems that decode signals from the receiving antennas and initiate flight termination,

c. two EBW firing units that provide high voltage charges to the detonators,

d. two EBW detonators that initiate detonation of the explosives,

e. a safety and arming device that completes or interrupts the explosive train,

f. Primacord that connects the explosive inserts in the safety and arming device to the shaped charges,

g. shaped charges that cut the propellant containers.

Because the command transmitters, receiving antennas, command systems, and EBW firing units are electronic components, they are not assigned finding numbers and do not appear on figure 1.

3.1. Command Transmitter

Command transmitters are provided in sets of three at Cape Kennedy and down-range stations (one transmitter for operation, one for standby, and one

spare). Each transmitter is equipped with an external audio coder that generates the channel frequency and modulates the FM carrier with the sequence of tones necessary to initiate flight termination.

3.2. Receiving Antenna

Four receiving antennas are installed on panels at the top of the S-I stage. Two are above fin I, and two are above fin III. These antennas receive signals from the command transmitter and transfer them to the S-I stage command systems. Four receiving antennas, installed at each fin line on the S-IV forward interstage, receive signals from the command transmitter and transfer them to the S-IV stage command systems.

3.3. Command System

Four command receivers, two on the S-I stage and two on the S-IV stage, provide 100-percent redundancy. Each command receiver (consisting of a UHF receiver, and audio decoder with associated relays, and a power regulator) demodulates and decodes FM signals from the command transmitter.

A destruct system controller is linked to each command receiver. Each controller contains the necessary circuitry to control the receiver signals for the EBW firing units and engine cutoff.

3.4. Exploding Bridgewire Firing Unit

An EBW firing unit is electrically installed between each destruct system controller and EBW detonator. The firing unit consists of a filter network, a high voltage power supply, an energy storage unit, and a switch and trigger circuit. The power supply transforms 28-volt vehicle power to 2300 volts, which is stored in a capacitor. A signal to the trigger circuit causes a spark-gap tube to conduct, allowing the capacitor to discharge through the EBW detonator.

3.5. Exploding Bridgewire Detonator

Two EBW detonators screw into each safety and arming device. These detonators, the initial ordnance component in each explosive train, contain a fine wire (bridgewire) embedded in pentaerythrite tetranitrate (PETN), a high-energy explosive. A gap in one lead within the detonator provides an open circuit that prevents inadvertent application of normal ground or vehicle power from burning out the bridgewire. The 2300-volt discharge from the EBW firing unit capacitor arcs across the gap and explodes the bridgewire, detonating the PETN.

3.6. Safety and Arming Device

A safety and arming device provides a mechanical block in each explosive train during pre-launch operations. This device consists of a rotary solenoid, 'safe' or 'armed' position switches, tapped holes for the EBW detonators and Primacord adapters, and a rotor with holes for two PETN inserts.

The rotary solenoid, actuated from the launch control center, positions the rotor in either the 'safe' or the 'armed' position. In the 'safe' position, the PETN inserts are aligned 90 degrees from the line between the detonators and the Primacord. In the 'armed' position, the PETN inserts are aligned between the detonators and the Primacord, thereby completing the explosive train.

3.7. S-I Stage Primacord and Shaped Charges

Lengths of 50 and 60 grains-per-foot (gpf) PETN Primacord transmit the explosion from the S-I stage safety and arming device to 100-gpf PETN shaped charges that sever the S-I stage propellant containers. Primacord Adapter Assemblies B508, lengths of Primacord with a 6-grain PETN fitting at one end, screw into Safety and Arming Device B504 and splice to Primacords B505. Primacords B505, with their free ends spliced together, encircle the S-I stage, forming a ring on the underside of the spider beam 45° fairing. Primacord and Shaped Charge Assemblies B507 splice to this ring. The shaped charge installs in a conduit down the outside of each propellant container. Upon detonation, the shaped charges emit directed streams of very high velocity particles that sever the propellant containers.

3.8. S-IV Stage Primacord and Shaped Charges

Primacord Assembly E311 transmits the explosion from S-IV stage Safety and Arming Device E303 to Shaped Charge Assemblies E304 and E309, which sever the LH_2 tank upon detonation. Primacord Assembly E310 transmits the explosion from Shaped Charge Assemblies E309 and E304 to Shaped Charge Assemblies E307, which sever the S-IV stage LOX tank. Each of these Primacord assemblies consists of two parallel lengths of 60-gpf PETN Primacord, taped together, with a 6-grain PETN fitting on each end of each length.

Each shaped charge assembly consists of a 100-gpf cyclotrimethylene trinitramine (RDX) linear shaped charge, with a 6-grain PETN fitting on each end of the shaped charge. Shaped Charge Assemblies E304 and E309 install in a tunnel down the outside of the LH_2 tank, and Shaped Charge Assemblies E307 form a ring around the bottom of the LOX tank.

3.9. S-I/S-IV Ordnance Interconnect*

Primacord explosively links the PDS ordnance on the S-I and S-IV stages through an interstage connection block. This block consists of two explosive coupling blocks, one on each side of the separation plane. Should only one PDS be detonated by its EBW firing units before separation, the explosion would propagate through the interstage connecting Primacord to a coupling block; explosive charges in that coupling block would detonate the other coupling block explosive charges across a small separation plane gap; and those charges would propagate the explosion through the Primacord to the other stage.

---

* Preliminary Information

A strand of Primacord Assembly E310 connects the S-IV stage ordnance, immediately below the LH_2 tank shaped charges, to Coupling Block E305. Primacord Assembly E312 connects the S-I stage ordnance at the Primacord ring to Coupling Block E306. Primacord B506 provides a redundant connection between Primacord E312 and the S-I stage Primacord ring.

4. FLIGHT TERMINATION SEQUENCE

The range safety officer can terminate vehicle flight after the following have occurred:

a. The safety and arming devices have been actuated to the armed position and the command systems have been transferred from external to vehicle power. This is done with manual switches in the launch control center before automatic countdown.

b. A relay in the destruct system controller has de-energized, completing the circuit from the command receiver. This occurs when the umbilical lines disconnect at liftoff.

Should the vehicle become a safety hazard, the range safety officer would close the thrust termination switch; and, 2.5 to 3 seconds later, he would close the destruct switch.* These actions would initiate the following sequence:

a. The command transmitters send a signal (thrust termination) to the vehicle.

b. The receiving antennas transfer the signal to the command receivers.

c. The command receivers demodulate and decode the signal and transmit the separated frequencies to the destruct system controllers.

* d. The destruct system controllers initiate engine cutoff and charge the EBW firing units.

e. The command transmitters send the second signal (destruct), which arrives at the destruct system controllers after going through the same basic sequence as the thrust termination signal.

f. The destruct system controllers actuate the EBW firing units.

---

* Preliminary Information

g. The EBW firing units explode the EBW detonators, igniting the explosive trains.

h. The shaped charges cut the skin of the propellant containers, allowing the remaining propellant to disperse and burn.

LIST OF FINDING NUMBERS

* FINDING NUMBER	NO. REQD	COMPONENT	REMARKS	VENDOR	DRAWING NUMBER	ELEC SYM
B104-1	1	Sensor, Level, Fuel	Container F-2	Acoustica Associates, Inc., PN 102479	20M30430	9A63
B104-2	1	Sensor, Level, Fuel	Container F-4	Acoustica Associates, Inc., PN 102479	20M30430	9A69
B105 through B118 are not functionally applicable to these systems.						
B119	1	Sensor, Depletion, Fuel	Container F-2	Acoustica Associates, Inc., PN 102570	60C27738	9A86
B120	1	Sensor, Depletion, Fuel	Container F-4	Acoustica Associates, Inc., PN 102570	60C27738	9A87
B121 through B160 are not functionally applicable to these systems.						
B161-1	1	Sensor, Level, LOX	Container 0-2	Acoustica Associates, Inc., PN 102469	20M30429	9A68
B161-2	1	Sensor, Level, LOX	Container 0-4	Acoustica Associates, Inc., PN 102469	20M30429	9A70
B162 through B499 are not functionally applicable to these systems.						
B500-1	1	Retrorocket Assembly	No. 1	Aerojet General Corp. PN 3-311696	20M29899	11A32
B500-2	1	Retrorocket Assembly	No. 2	Aerojet General Corp. PN 3-311696	20M29899	11A33
B500-3	1	Retrorocket Assembly	No. 3	Aerojet General Corp. PN 3-311696	20M29899	11A34

*Location: A = Ground; B = S-I Stage; E = S-IV Stage; G = Instrument Unit; H = Payload

FINDING NUMBER	NO. REQD	COMPONENT	REMARKS	VENDOR	DRAWING NUMBER	ELEC SYM
B500-4	1	Retrorocket Assembly	No. 4	Aerojet General Corp. PN 3-311696	20M29899	11A35
B501	8	Initiator	Retrorocket	Aerojet General Corp. PN 505850	20M29905	
B502						
B503	4	Igniter	Retrorocket	Aerojet General Corp. PN 363897	20M29904	
B504	1	Safety and Arming Device	Propellant Dispersion	Douglas Aircraft Co. PN 1A02446-1	10M11027	11A12
B505-1	1	Primacord	Propellant Dispersion 50-gpf x 357-in. PETN	Ensign-Bickford Co.	10M11238-11	
B505-2	1	Primacord	Propellant Dispersion 50-gpf x 412-in. PETN	Ensign-Bickford Co.	10M11238-13	
B506*	1	Primacord	Propellant Dispersion 50-gpf x 40-in. PETN	Chrysler Corp.	10M11238-15	
B507-1	1	Primacord & Shaped Charge (SC) Assembly	Propellant Dispersion 50-gpf PETN Primacord 100-gpf x 240-in. PETN SC	Chrysler Corp.	10M11239-1	
B507-2	2	Primacord & Shaped Charge Assembly	Propellant Dispersion 50-gpf PETN Primacord 100-gpf x 646-in. PETN SC	Chrysler Corp.	10M11240-1	
B507-3	2	Primacord & Shaped Charge Assembly	Propellant Dispersion 50-gpf PETN Primacord 100-gpf x 644-in. PETN SC	Chrysler Corp.	10M11240-3	
B507-4	4	Primacord & Shaped Charge Assembly	Propellant Dispersion 50-gpf PETN Primacord 100-gpf x 640-in. PETN SC	Chrysler Corp.	10M11240-5	

*Preliminary Information

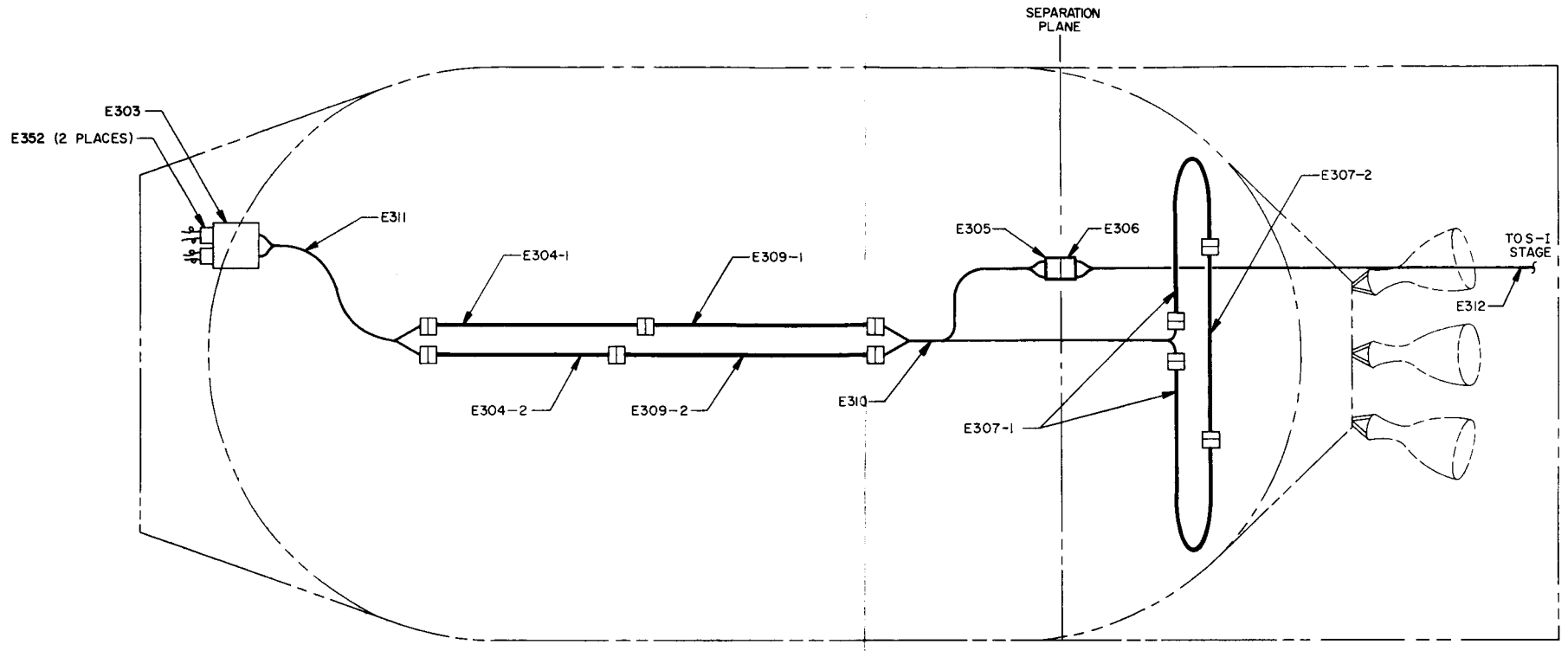
FINDING NUMBER	NO. REQD	COMPONENT	REMARKS	VENDOR	DRAWING NUMBER	ELEC SYM
B508	2	Primacord Adapter Assembly	Propellant Dispersion 60-gpf x 60-in. PETN Primacord 6-grain PETN End Fitting	Douglas Aircraft Co.	10M11026	
B509	2	Detonator, EBW	Propellant Dispersion	Douglas Aircraft Co. PN 7865742-1	10M11028	Part of 11A12
B510 through E289 are not functionally applicable to these systems.						
E290	4	Rocket, Ullage		Thiokol TX-280 PN FR 36192		
E291-1	2	Initiator	Ullage Rocket No. 1	Thiokol TX-346		411A3
E291-2	2	Initiator	Ullage Rocket No. 2	Thiokol TX-346		412A3
E291-3	2	Initiator	Ullage Rocket No. 3	Thiokol TX-346		413A3
E291-4	2	Initiator	Ullage Rocket No. 4	Thiokol TX-346		414A3
E292	8	Nut, Frangible	Ullage Rocket Jettison ½ in.	Douglas Aircraft Co. PN 1A72620-1		
E293-1	2	Explosive Harness Assembly	Ullage Rocket Jettison	Douglas Aircraft Co. PN 1A00773-1		
E293-2	2	Explosive Harness Assembly	Ullage Rocket Jettison	Douglas Aircraft Co. PN 1A00773-501		
E294	4	Igniter	Ullage Rocket Ignition	Thiokol PN DR 37897		

FINDING NUMBER	NO. REQD	COMPONENT	REMARKS	VENDOR	DRAWING NUMBER	ELEC SYM
E295 through E301 are not functionally applicable to these systems.						
E302	4	Nut, Frangible	Stage Separation, 9/16 in.	Douglas Aircraft Co. PN 1A72619-1		
E303	1	Safety and Arming Device	Propellant Dispersion	Douglas Aircraft Co. PN 1A02446-1		410A20
E304-1	1	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 57-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886337-501		
E304-2	1	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 53.5-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886337-1		
E305*	1	Block, Separation	Propellant Dispersion	Douglas Aircraft Co.		
E306*	1	Block, Separation	Propellant Dispersion	Douglas Aircraft Co.		
E307-1	2	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 55-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886334-1		
E307-2	1	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 55-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886333-1		
E308-1	6	Detonating Cord Assembly	Vent Panel Release	Douglas Aircraft Co. PN 4882928-1		
E308-2	2	Detonating Cord Assembly	Vent Panel Release	Douglas Aircraft Co. PN 4882928-501		
E309-1	1	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 60.5-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886336-501		

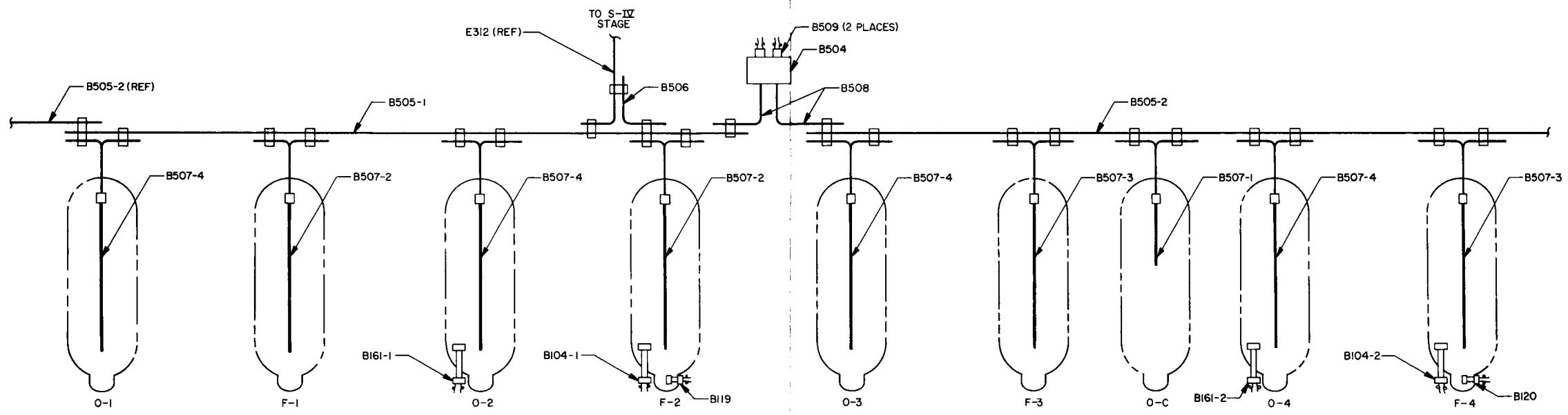
*Preliminary Information

FINDING NUMBER	NO. REQD	COMPONENT	REMARKS	VENDOR	DRAWING NUMBER	ELEC SYM
E309-2	1	Shaped Charge Assembly	Propellant Dispersion 100-gpf x 64-in. RDX SC Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886336-1		
E310	1	Explosive Harness Assembly	Propellant Dispersion 60-gpf x 154-in. PETN Primacord Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886335-1		
E311	1	Explosive Harness Assembly	Propellant Dispersion 60-gpf x 160-in. PETN Primacord Two 6-grain PETN End Fittings	Douglas Aircraft Co. PN 3886338-1		
E312*	1	Explosive Harness Assembly	Propellant Dispersion, 60-gpf x 254-in. PETN Primacord (+10-in. Length at Separation Block)	Douglas Aircraft Co.		
E313	1	Explosive Harness Assembly	Stage Separation	Douglas Aircraft Co. PN 3883012-501		
E314 through E349 are not functionally applicable to these systems.						
E350	2	Detonator, EBW	Ullage Rocket Jettison	Douglas Aircraft Co. PN 7865742-1		407A19
E351-1	1	Detonator, EBW	Separation	Douglas Aircraft Co. PN 7865742-1		400A6
E351-2	1	Detonator, EBW	Separation	Douglas Aircraft Co. PN 7865742-1		400A7
E352	2	Detonator, EBW	Propellant Dispersion	Douglas Aircraft Co. PN 7865742-1		Part of 410A20
E353	2	Detonator, EBW	Vent Panel Release	Douglas Aircraft Co. PN 7865742-1		400A3
E354 and subsequent finding numbers are not functionally applicable to these systems.						

*Preliminary Information



S-IV PROPELLANT DISPERSION ORDNANCE



S-I PROPELLANT DISPERSION ORDNANCE & PROPELLANT LEVEL SENSORS

FIGURE I. FLIGHT TERMINATION SYSTEM

CSA 5053

Please forward any suggested changes, additions, and corrections to the Applied Engineering Communications Section (4612), Chrysler Corporation, Space Division, Huntsville, Alabama.

COPY NO. _____

THIS BOOK CONTAINS _____ PAGES. ☐ ONE SIDE ONLY. ☐ BACK TO BACK

_____ PAGES HAVE BEEN LEFT INTENTIONALLY BLANK.

THIS BOOK WAS INSPECTED BY _____ AND FOUND TO BE COMPLETE.

SPACE DIVISION CHRYSLER CORPORATION

HUNTSVILLE OPERATIONS

DISTRIBUTION

CCSD-HO (Dept. 4600), BALFOUR, C.L. (10)
CCSD-NO (Dept. 2714), BEAMER, W. (14)
CCSD-NO (Dept. 2240), SIMMONS, F. (2)
DAC (Dept. A2-857), BELWOOD, H.
DAC, KEATING, J.
DAC, HOLLISTER, R. (Dept. A3-770)
I-I/IB-SI, CHAMBERS, J.
I-I/IB-SIV, FERGUSON, W.
I-I/IB-SIVH, LEAGUE, R.
I-I/IB-SIVL/DAC, STOOPS, G.
I-I/IB-SIVL-NASA/DAC-SACTO, TYSON, O.
I-I/IB-SIVL-NASA/DAC-SANTA MONICA, WEAVER, E.
I-MICH-OA, STEVENSON, H.
I-MICH-OA, QUINTON, H.
KN-BS27, WHISENANT, R.
KN-DA, POPPEL, T.
KN-DE2, HAHN, R.
KN-DE2, GRIFFIN, F.
KN-DE2, DZIADON, E. (2)
KN-DE2, REID, R.
KN-DE2, MOORE, R.
KN-DE2, STAHLEY, S.
KN-DE2, CHAPPLE, E.
KN-DE4, DOWNS, J.
KN-DE5, GRIFFIN, F.
KN-DF2, CAREY, T.
KN-DL2, BUCHANAN, D.
KN-DP2, MIMS, W.
KN-DP2, MINTON, C.
KN-DP2, SPARKMAN, O.
KN-DP2, WASILESKI, C.
KN-DP4, NELSON, R.
KN-DP5, WRIGHT, R.
KN-DR2, HOOKER, J. (5)
KN-DS232, BUNCH, M.
KN-ET, BRIDEWELL, C.
KN-FE, DODD, R. (2)
KN-AG, RUSSELL, L. (2)
KN-GT44, HAWKINS, G.
KN-L, GORMAN, R.
KN-LP2, SWEAT, C.
KN-M, PICKETT, A.
KN-P, PETRONE, R.
KN-PA, MATTHEWS, E.
KN-PC, BODY, R. (2)
KN-V, O'HARA, A.
KN-VG, RIGELL, I. (2)
KN-VG2, GREENFIELD, T.
KN-VG22, DOWLING, C. (4)
KN-VG23, ROUSE, C. (4)
KN-VL, GREENE, D. (5)
KN-VL, WHISENANT, E. (2)
KN-VM, PICKETT, A.
KN-VM2, ROBINSON, G.
KN-VM2, RAINWATER, W.
KN-VM3, PANTOLIANO, T. (3)
KN-VM22, DeLaROSA, H.
KN-VM22, FANNIN, L. (8)
KN-VM23, SCOVILLE, D.
KN-VM24, HILL, L.
LVO-DIR, WILLIAMS, M.
LVO-AD, ZEILER, A.
LVO-L, BELLAMY, E. (5)
R-ASTR-E, FICHTNER, H.
R-ASTR-EA, SMITH, R. (5)
R-ASTR-EAA, PASCHAL, L.
R-ASTR-ES, ADEN, R. (3)
R-ASTR-ESI, MILNER, R.
R-ASTR-I, HOBERG, O.
R-ASTR-IM, POWELL, J.
R-ASTR-TR, WAGNON, W.
R-ME-A, NOWAK, M.
R-P&VE-AV, NEIGHBORS, W.
R-P&VE/DAC, MEZO, C.
R-P&VE-PA, REED, K.
R-P&VE-PEM, HOLMES, J. (2)
R-P&VE-PM, FUHRMANN, H. (2)
R-P&VE-PP, HEUSINGER, B.
R-P&VE-PT, WOOD, C.
R-P&VE-V, PALAORO, H.
R-P&VE-VA, HOFFMAN, C.
R-P&VE-VAS, MOON, R.
R-P&VE-VF, ROTHE, K.
R-P&VE-VI, FAULKNER, W. (2)
R-P&VE-VK, BOONE, C.
R-P&VE-VM, BECK, M.
R-P&VE-VNW, DEVENISH, R. (5)
R-P&VE-VO, KISTLER, W. (20)
R-P&VE-VS, SCHULZE, W.
R-P&VE-VSA, PRASTHOFER, W.
R-P&VE-VSI, HURT, W. (2)
R-P&VE-VSI, KRAUS, G. (2)

DISTRIBUTION (Cont'd.)

R-P&VE-VSP, AKINS, J.
R-QUAL-A, URBANSKI, A. (2)
R-QUAL-AAA, CALDWELL, W.
R-QUAL-J, QUINN, C.
R-QUAL-P, BROOKS, C.
R-QUAL-PI, CONAWAY, J.
R-TEST-CF, FORBIS, M.
R-TEST-I, SIEBER, W.
R-TEST-S, DRISCOLL, D.